

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. No claim is being currently amended. claims 1-15 are now pending in this application. As new matter is introduced, entry thereof by the Examiner is respectfully requested.

I. Claim Rejections 35 U. S. C. §112

Claims 14 and 15 are rejected 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse.

Claim 14 recites that the reagent further comprises a mild acid, and claim 15 recites that the mild acid is pyridinium p-toluenesulfonate or p-toluenesulfonic acid. Applicants respectfully submit that support for claims 14 and 15 can be found throughout the Specification. For example, the paragraph starting at page 10, line 12 states:

“As the acid catalyst to be used, for example, pyridinium p-toluenesulfonate, p-toluenesulfonic acid, benzenesulfonic acid, methanesulfonic acid, trifluoromethane sulfonic acid, acidic ion exchange resin and the like can be mentioned, and pyridinium p-toluenesulfonate and p-toluenesulfonic acid are preferable. In view of the applicable weak acidic mild reaction conditions, pyridinium p-toluenesulfonate is preferable, and in view of the short reaction time, p-toluenesulfonic acid is preferable. Thus, a suitable acid catalyst can be appropriately selected in consideration of the stability of the hydroxyl group-containing compound and producibility.”

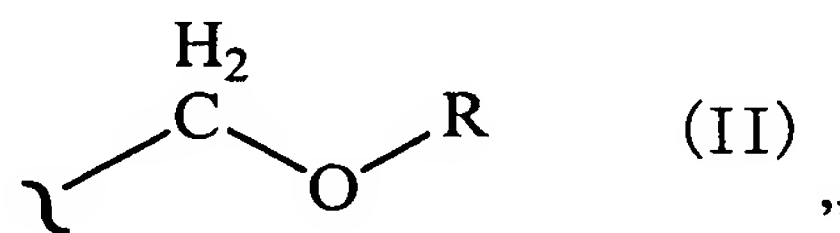
Thus, the above embodiments of the Specification clearly teach a mild acid of pyridinium p-toluenesulfonate may be used as the catalyst. In other words, in addition to the compound represented by formula (I), a mild acid (e.g., pyridinium p-toluenesulfonate) may be further comprised in the “reagent that is reactive to a hydroxyl group to form a hydroxyl-protecting group”.

For at least the above reasons, Applicants respectfully request withdrawal of the 112 rejection.

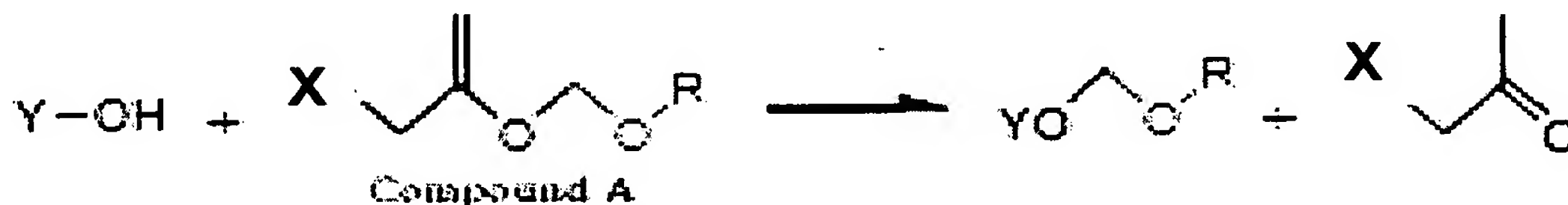
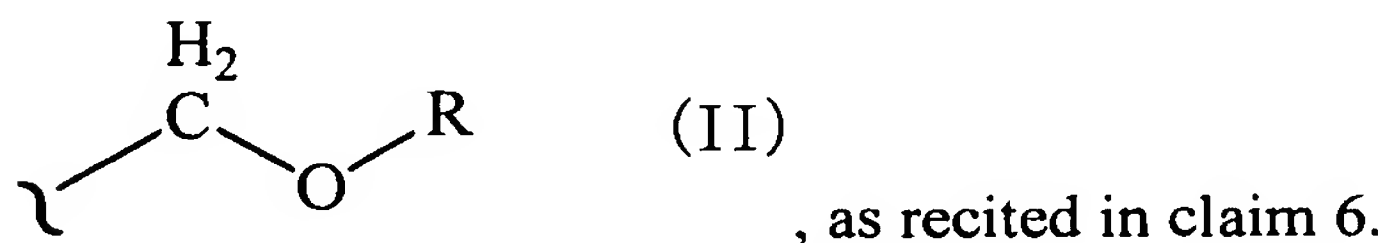
II. Claim Rejections 35 U. S. C. §102

Claims 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Gu (J. Org. Chem., Vol. 51, No. 26, December 1986, pp. 5425-5427). Applicants respectfully traverse this ground for rejection.

Claim 6 recites a “reagent that is reactive to a hydroxyl group to form a hydroxyl-protecting group, wherein the hydroxyl-protecting group is represented by formula (II):

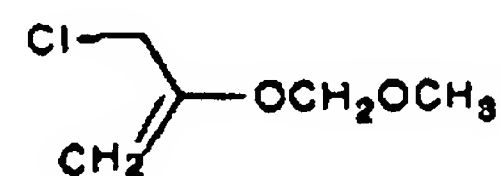


Specifically, if the hydroxyl group to be protected is presented as Y-OH, the protected hydroxyl formed would be Y-O-CH₂-O-R. For example, in order to protect the hydroxyl group of Y-OH, compound A according to formula (I) recited in claim 6 may react with the hydroxyl group of Y-OH as shown in Scheme (A) illustrated below, forming a waste of X-CH₂-C(=O)-CH₃ and a protected alcohol protected by a hydroxyl-protecting group of



Scheme (A)

In this Office Action, the Examiner points to compound 2 of Gu (right column of Page 5425) and alleges that Gu anticipates claims 6-9. Applicants respectfully disagree.

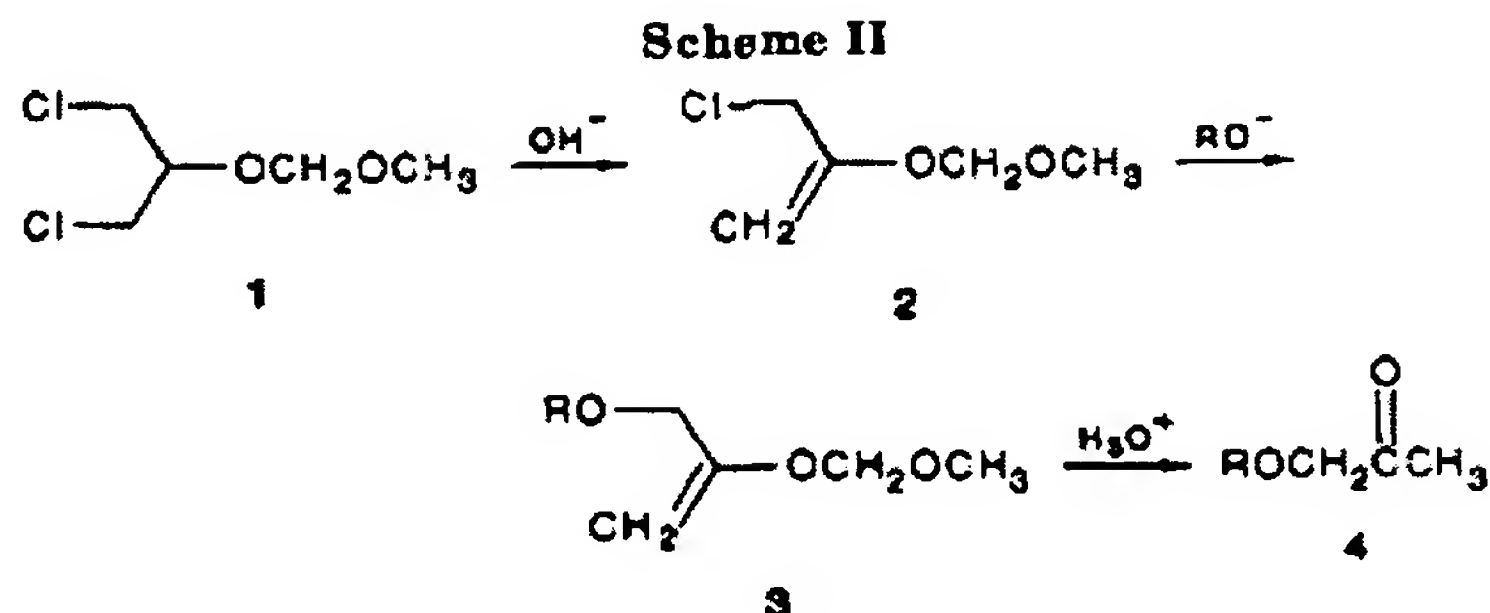


True, Gu teaches a compound (compound 2) according to formula

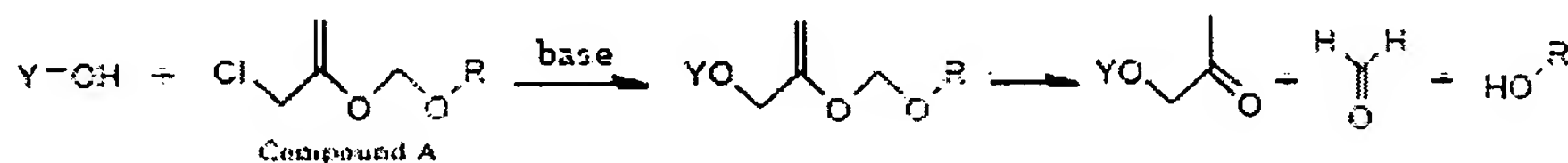
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However, as shown in Scheme 2 of Gu, compound 2 reacts with the alcohol to be protected,

R-OH (presented as RO⁻ in Scheme II of Gu due to the basic condition), and forms ROCH₂C(=O)CH₃.



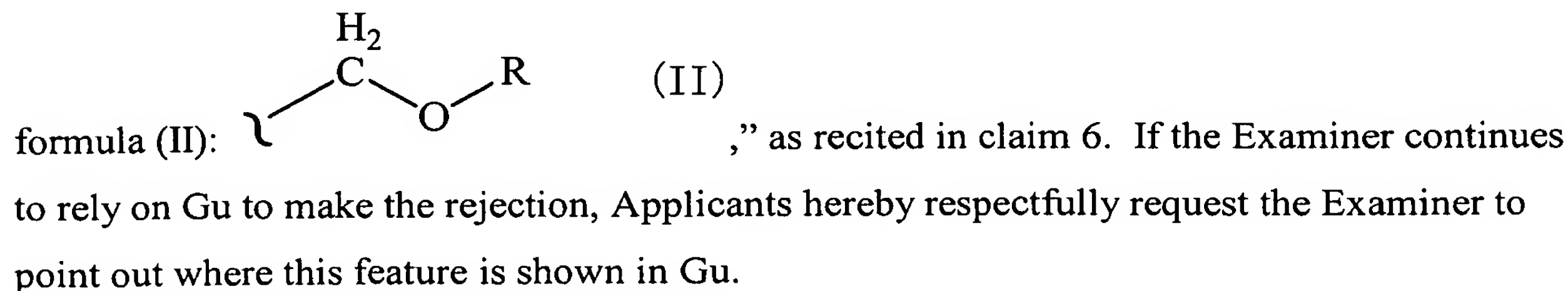
In other words, if compound 2 of Gu were equated to the reagent as recited in claim 6 with RO- being equated to a basic form of an alcohol (Y-OH), Scheme II of Gu would be equivalent to Scheme B as illustrated below.



Scheme (B)

Such a reaction disclosed by Gu substitutes Y-O- (of Y-OH) with -Cl (of Compound A) forming a -CH₂C(=O)CH₃ protected hydroxyl group and wastes of H₂C=O and ROH. In other words, the resulting hydroxyl-protecting group would have been -CH₂C(=O)CH₃, in contrast to a hydroxyl-protecting group of -CH₂OR recited in claim 6.

Thus, Gu fails to teach that “the hydroxyl-protecting group is represented by the

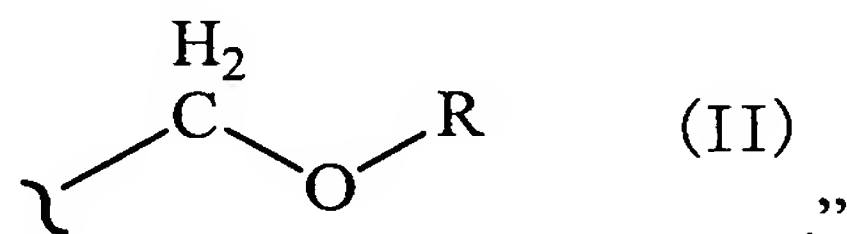


Claims 7-9 depend from claim 6, and thus are patentable for at least the same reasons.

III. Claim Rejections 35 U. S. C. § 103

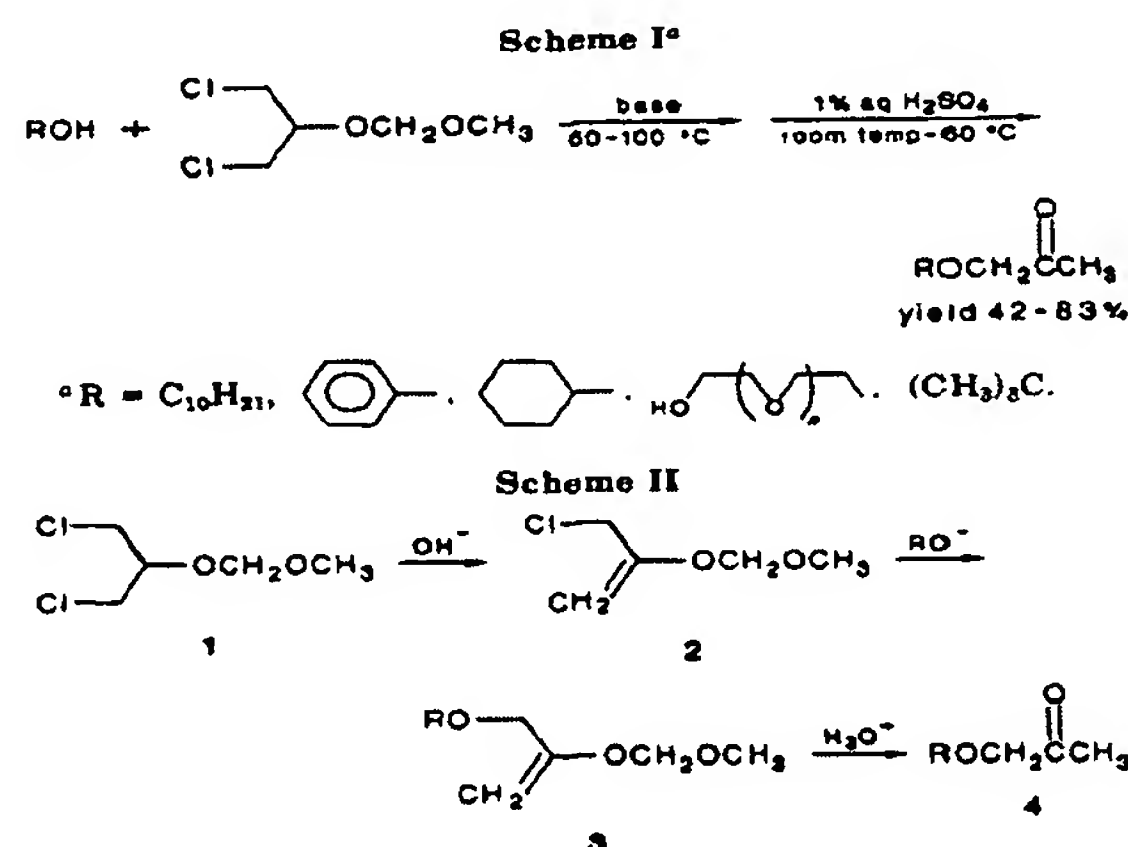
Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gu (J. Org. Chem., Vol. 51, No. 26, December 1986, pp. 5425-5427) in view of Beauchamp et al. (J. Med. Chem., Vol. 31, No. 1, January 1988, pp. 144-149) and further in view of Horino et al. (US 5,739,100). Applicants respectfully traverse this ground for rejection.

Claim 1 is directed to a method of protecting a hydroxyl group, comprising reacting a hydroxyl group-containing compound with a compound represented by the formula (I) “in the presence of an acid catalyst to substitute the hydrogen atom of the hydroxyl group of the hydroxyl group-containing compound with a protecting group represented by the formula (II):



In this Office Action, the Examiner points to Pages 5425-5426 of Gu et al. and alleges that “Gu et al. inherently teach the claimed method of protecting a hydroxyl group, since Gu et al. teach reacting a hydroxyl group-containing compound with a compound having the claimed formula (I) in the presence of an acid.” Applicants respectfully disagree.

Specifically, the cited portion of Gu states (Emphasis Provided):



“... The acetonylation of hydroxyl compounds was carried out under basic conditions, generally in the presence of PT catalyst, and the successive acidic hydrolysis completed the reaction path to acetyl ethers is shown in Scheme I.

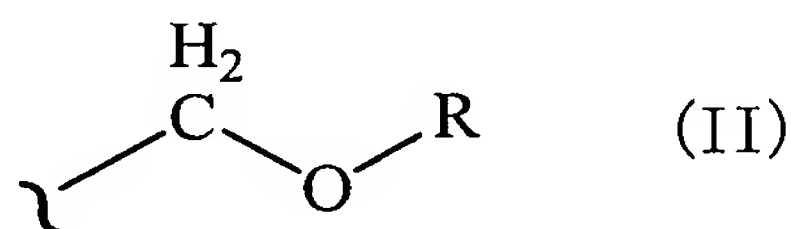
The reaction pathway may be considered as follows (Scheme II); 2-(chloromethyl)-3,5-dioxahex-1-ene (2) formed through elimination of hydrogen chloride is attached by alkoxide anion to afford 3, which is then converted to acetyl ether by hydrolysis in acidic

medium. Compounds 2, 3, and acetonyl ethers 4 were isolated by distillation at reduced pressure and identified by the spectral and elemental analyses.”

First, Gu explicitly teaches that compound 2 of Gu is an intermediate for acetylation of alcohols which reacts with alcohol and forms a hydroxyl-protecting group different from formula (II) as recited in claim 1.

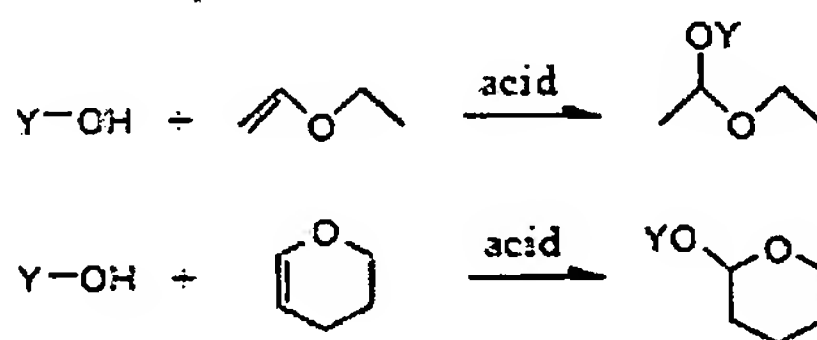
Second, although an acidic condition was used for treating compound 3 (the product of the reaction between compound 2 and the alcohol under basic conditions), this acidic condition is not used for reacting compound 2 and the alcohol. Indeed, Gu explicitly teaches reacting Compound 2 with the alcohol under basic conditions, and thus teaches away from “a method of protecting a hydroxyl group, . . . , in the presence of an acid catalyst to substitute the hydrogen atom of the hydroxyl group of the hydroxyl group-containing compound with a protecting group represented by the formula (II),” as recited in claim 1.

Furthermore, it is unexpected that the use of an acid catalyst causes a reaction between a compound according to formula (I) with an alcohol Y-OH, forming a hydroxyl group protected by a hydroxyl-protecting group according to Formula (II):



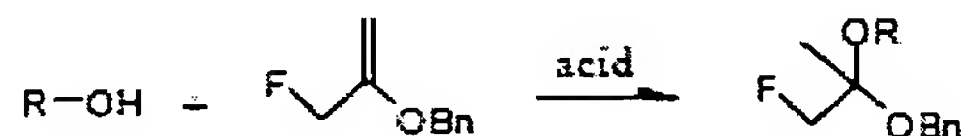
According to previous publications in the field, those of ordinary skill in the art would normally expect an additive reaction to the olefin moiety, when a compound having a double bond adjacent to oxygen atom (e.g., compound A illustrated in the above Schemes) reacts with Y-OH in the presence of an acid catalyst.

For example, additive reactions of alcohol to ethylvinyl ether and to DHP, as shown in Scheme C, are well known in the art and described in textbooks.



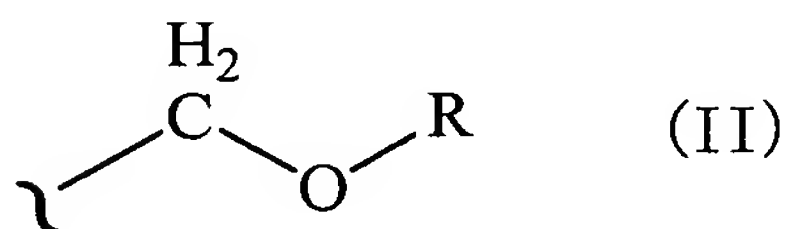
Scheme C

Accordingly, Exhibit I enclosed herewith (Mukaiyama et al., Chemistry Letters, pp. 615-618, 1984) teaches an additive reaction of alcohol to olefin occurs in the presence of an acid, as shown in Scheme D.



Scheme D

Thus, it would not be obvious to one having ordinary skill in the art to react the alcohol with a compound represented by formula (I) in the presence of an acid catalyst to substitute the hydrogen atom of the hydroxyl group of the hydroxyl group-containing compound with a protecting group represented by the formula (II):



Beauchamp and Horino are cited for disclosing other features of the claims but both references fail to cure the deficiencies of Gu, as explained above.

For at least the above reasons, Applicants respectfully submit that *Prima Facie* obviousness is not established.

Claims 2-5 depend on claim 1, and are thus patentable for at least the same reasons.

As explained above, Gu does not disclose a reagent that is reactive to a hydroxyl group to form a hydroxyl-protecting group, wherein “the hydroxyl-protecting group is

represented by formula (II): $\text{H}_2\text{C-OR} \quad (\text{II})$,” as recited in claim 6.

Beauchamp and Horino are cited for disclosing other features of the claims but the references fail to cure the deficiencies of Gu explained above. Thus, even if Gu, Beauchamp

and Horino were combined, the combination would not teach or suggest all of the features of claim 6.

Claim 7-9 and 14-15 depend from claim 6, and are thus patentable for at least same reasons.

Claims 10-13 recite analogous features and thus are patentable for at least the same reasons.

Conclusion

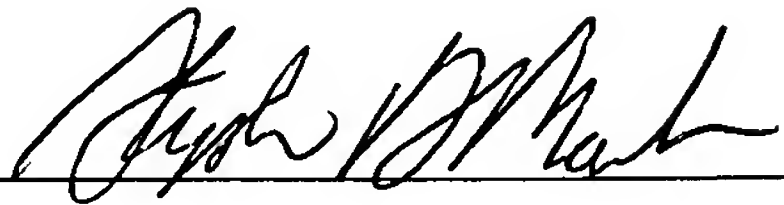
Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date March 30, 2009

By 

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